国総研ニューズレター
NILIM News Letter
No.58
Autumn 2016

NILIM Lecture Meeting

The NILIM Lecture Meeting will be held on December 8 (Thursday) in Nissho Hall. The major theme of the special lecture and sessions will be the Kumamoto Earthquake Disaster.

The NILIM Lecture Meeting is an event held annually to introduce initiatives undertaken by the NILIM to the general public by giving lectures and presenting reports on the most recent research achievements, research themes, and trends at the NILIM.

This year, Professor Emeritus Kubo Tetsuo of the University of Tokyo will present a special lecture, "Damage to Buildings by the 2016 Kumamoto Regional Earthquake in addition to Past Earthquake Damage." At a special session, lectures on the theme "Technical Support by the NILIM for Disaster Activities, Restoration and Reconstruction based on Knowledge and Experience of Past Disasters" will be presented.

Date/time: Dec. 8 (Thurs.), 2016
10:15–17:05 (Doors open at 10:00)
Place Nissho Hall (2-9-16 Toranomon, Minato-ku, Tokyo)
Fee: free
Capacity: 700 people (first 700 applicants)

Details and application to attend ☛
http://www.nilim.go.jp/lab/bbg/kouenkai/kouenkai2016/kouenkai2016.htm

Program

10:15 AM to 10:20 AM	Opening greeting	NILIM Director-General Fujita Koichi
■ Session "Improving Productivity -- ICT Based Innovations --"		
10:30 AM to 10:45 AM	Towards Innovation in Building Production Systems	Research Center for Land and Construction Management, Director, Matsui Takeshi
10:45 AM to 11:00 AM	Research to Create the "Compact Plus Network" Urban Structure	Urban Planning Dept., Director, Sato Kenichi
11:00 AM to 11:15 AM	Research on the Intelligent Use of Roads through IT Technology	Road Traffic Dept., Director, Oka Kunihiko
■ Session "Strengthening Maintenance and Competitiveness"		
11:30 AM to 11:45 AM	Towards Strengthening Maintenance of Airport Facilities	Airport Dept., Director, Tanigawa Yuji
11:45 AM to 12:00 PM	Recent Initiatives Concerning Port and Harbor Technology Standards	Port and Harbor Dept., Director, Watanabe Tomihiro
12:00 PM to 12:15 PM	Research Trends and Future Prospects in Building Materials Production at the NILIM	Building Dept., Research Managing Coordinator for Advanced Building Technology, Kage Tadatsugu
◆ Special Lecture		
1:15 PM to 2:15 PM	Damage to Buildings by the 2016 Kumamoto Regional Earthquake in addition to Past Earthquake Damage, Professor Emeritus Kubo Tetsuo of the University of Tokyo	
■ Special Session: Technical Support by the NILIM for Disaster Activities, Restoration and Reconstruction based on Knowledge and Experience of Past Disasters		
2:15 PM to 2:45 PM	Sustainable Usability of Buildings After Earthquakes – Present State and Challenges –	Housing Dept., Director, Fukuyama Hiroshi
2:45 PM to 3:15 PM	Damage to Road Structures by the Kumamoto Earthquake and Technical Support with Reconstruction	Road Structures Dept., Director, Kimura Yoshitomi
3:15 PM to 3:45 PM	Outline of Flooding in 2016 and Response by the NILIM	River Dept., Director, Amano Kunihiko
3:45 PM to 4:00 PM	Technical Support for Disaster Activities, Restoration and Reconstruction by the NILIM	Research Center for Land and Construction Management, Research Coordinator for Construction Management (jointly) Kyushu Regional Development Bureau, Kumamoto Earthquake Damage Countermeasure Promotion Office, Chief Technologist, Kiyasu Kazuhide
■ Session "Disaster Prevention & Mitigation"		
4:15 PM to 4:30 PM	Front Line of Urban Flood Measures – Development and Future of Technology Applying ICT –	Water Quality Control Dept., Director, Sakakibara Takashi
4:30 PM to 4:45 PM	Coastal Environment and Disaster Prevention Response to Tsunamis	Coastal, Marine and Disaster Prevention Dept., Suzuki Takeshi
4:45 PM to 5:00 PM	Predicting Sediment Disasters Using Real-Time Observation and Monitoring Data	Sabo Dept., Director, Okamoto Atsushi
5:00 PM to 5:05 PM	Closing greeting	NILIM Deputy Director-General, Miyake Koichi

Publication of a Report on NILIM Research on the Great East Japan Earthquake

Disaster Prevention and Reduction Research Committee

The "Complete Record of Five Years of Survey and Research by the National Institute of Land and Infrastructure Management Related to the Great East Japan Earthquake", which is a record of all activities of the NILIM related to the Great East Japan Earthquake, was published at the end of September 2016.

More than 5 years have passed since the Great East Japan Earthquake. During this period, the Ministry of Land, Infrastructure, Transport and Tourism has been revising technology standards and guidelines in light of new knowledge gained from damage inflicted by the earthquake.

In September 2016, the NILIM published the "Complete Record of Five Years of Survey and Research by the National Institute of Land and Infrastructure Management Related to the Great East Japan Earthquake", which is a systematic record of surveys and research led by the NILIM to provide the grounds for the revision of technical standards and guidelines.

This research report presents lessons concerning responding to the two threats, earthquakes and tsunamis, based on the severe damage caused by this giant magnitude 9 earthquake and the tsunami, from two perspectives: hard (structures) and soft (systems and procedures) measures. The report looks into matters in many fields which are the responsibility of the Ministry of Land, Infrastructure, Transport and Tourism, including wastewater management, rivers, seashores, sediment disasters, road traffic, road structures, buildings, housing, cities, coastal protection, ports, airports, and social capital management.

Part I, which gives an overview of the relations between each type of survey research, positions the material in Part III Disaster surveying and Part IV Achievements of the Research, and clarifies their interrelationships and a comprehensive perspective that includes cross-sectoral initiatives.

In order to accelerate the restoration as the response to the Great East Japan Earthquake transitions from the period of concentrated restoration to the period of restoration and creation, we hope this report will be used to support restoration and reconstruction following the Kumamoto Earthquake and contribute to the prevention and reduction of disasters in the future.

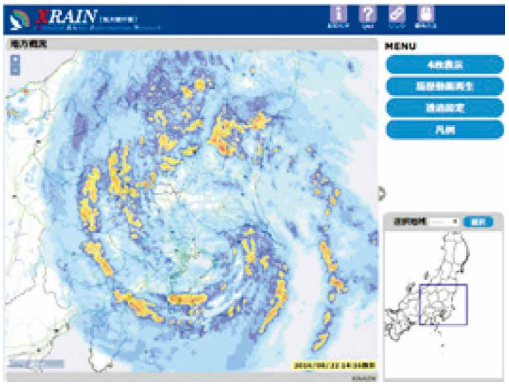
Details ☛ http://www.nilim.go.jp/lab/bcg/siryou/rpn/rpn0057.htm

Technology Developed by NILIM Expands the XRAIN Distribution Area – Trial operation now in progress –

River Bureau, Water Cycle Division

The XRAIN distribution area is greatly expanded, and trial operation of this expanded system is now in progress.

The Ministry of Land, Infrastructure, Transport, and Tourism performs nearly real-time (delay of 1 or 2 min) public distribution of high-resolution (resolution: 250-m meshes, distribution interval: 1 minute) radar rainfall information based on XRAIN, which can clarify localized and abrupt heavy rain, which has been increasing steadily in recent years. Until now, XRAIN consisted solely of X-band MP radar rain gauges, but their radio waves attenuated easily, leaving some areas unmonitored. The performance of conventional C-band radar rain gauges, which observed nationwide rainfall at 5-minute intervals in 1-km meshes, was improved (given MP capability), and they have been equipped with technology developed by the NILIM to permit them to be combined with X-band MP radar rain gauges. As a result, at the same time as the XRAIN distribution area has been greatly expanded, areas omitted by the former XRAIN system are now covered by the C-band MP radar rainfall gauges, thus stabilizing observations. Please take a look at the trial operation of XRAIN (expanded trial version) that is now in progress.



View of the XRAIN expanded trial version
(This shows how XRAIN performed observations without missing any areas of the rainfall near the center of typhoon No. 9 that made landfall in Kanto in August 22 of this year.)

Details ☛ (http://www.river.go.jp/x/xmn0107010.php)

Technical Guidance on Surveying of Restoration of Homes and Hamlets in the Kumamoto Earthquake Disaster Region

Housing Dept.

The NILIM works with the Building Research Institute to provide technical guidance through surveys and studies to restore homes and hamlets, etc. in cities, towns, and villages damaged by the Kumamoto Earthquake.

Local government bodies in the Kumamoto Earthquake disaster region must carry out restoration and reconstruction of damaged homes and hamlets, but many cities, towns, and villages do not have enough know-how and manpower to do so smoothly.

Therefore, the Housing Department is providing technical guidance to cities, towns and villages in the disaster region and to consultants involved in restoration work in response to a request by the MLITT in a program implemented this year by the MLITT Housing Bureau: Restoration Survey of Homes and Hamlets in the Kumamoto Earthquake Disaster Region. The surveys are conducted in 10 cities, towns, and villages designated as severely damaged regions (Aso City, towns of Minami-aso, Nishihara, Ozu, Mashiki, Mifune, and Kosa, Uto City, Uki City, and Kashima Town) which have a particularly great need for assistance. The goals of the surveying are 1) clarifying the intentions of disaster victims regarding home reconstruction, 2) preparing basic guidelines for restoration, etc. of homes and hamlets, 3) studying the application of specific construction methods (housing environment improvement projects such as damaged public housing improvement projects and small-scale residential land improvement project etc.), and 4) studying basic plans for candidate damaged public housing for the project.

Photo 1: It is necessary to remove deteriorated housing in existing public housing estates and build new public housing.

Photo 2: It is necessary to reuse wooden emergency temporary housing to reconstruct damaged public housing.

The technical guidance is given in cooperation with the Building Research Institute, and on the scene, jointly with the Kyushu Regional Development Bureau and Kumamoto Prefecture. Liaison and coordination meetings attended by representatives of cities, towns, and villages in the disaster region are held periodically. The local governments in the disaster region share the details and results of studies conducted in each municipality. The technical guidance will continue until the end of this year. Later reports will cover the achievements of the support.

Participation in the Activities of the International Civil Aviation Organization (ICAO)

Airport Department, Airport Planning Division

The NILIM takes part in international conferences held to discuss the planning of facilities, and international standardization of facilities, such as widening airport runways in order to help ensure the safe operation of aircraft.

The International Civil Aviation Organization (ICAO) enacts international technical standards for aviation as annexed documents to the Convention on International Civil Aviation (Chicago Convention). To revise standards and to enact new standards, expert committees called "Panels" are established for each matter studied, and within each Panel a Working Subcommittee performs the actual revision and enactment work.

In the Panels and Working Subcommittees, "Advanced and detailed technology studies" are conducted, accompanied by deliberations and negotiations concerning proposed revisions to the Annexed Documents to the Convention. Regarding airports, researchers from the NILIM Airport Department participate as advisors to the Civil Aviation Authority executives who conduct negotiations, and through

Photo Aerodrome Design and Operations Panel (November at ICAO headquarters)

the meetings, research results and knowledge are used in order to ensure the safe operation of aircraft at airports.

At present, the revision of the Airport Standard Code, which provides the basis for the fundamental specifications of key airport facilities, and the revision of other important specifications such as runway widths are being discussed. During the past year, the Working Subcommittees have met five times and held active discussions. An Aerodrome Design and Operations Panel meeting held in November deliberated a proposed revision to an annexed document of the Convention that had been placed before the panel, and an agreement was reached at the experts level.

The NILIM will continue to participate in the Panels and Working Groups.

Build a Bridge with Cardboard Contest held

Planning and Research Administration Department, Planning Division

The Build a Bridge with Cardboard contest was held with 34 elementary schools in City of Tsukuba taking part. A total of 596 entries were made and submitted by 657 pupils. The award ceremony for the best entries was held at the Civil Engineering Day Open House venue.

This year's Build a Bridge with Cardboard Contest was the 23rd in a series that has been held every year since 1994. This contest is held to encourage elementary school children, who will lead Japan in the future, to learn the importance of bridges and other civil engineering infrastructure that supports their daily lives through creative activities.

Until last year, the participants were grade 5 pupils in elementary schools in Tsukuba, but from this year, both grade 4 and 5 pupils can take part. As a result, 596 entries made by 657 pupils at 34 elementary schools were submitted, almost doubling the number of participants over the previous year. (Last year's participation: 340 entries by 379 pupils)

The contest was announced at the end of May and the children made their entries as summer holiday assignments.

The construction conditions were strict: the major bridge material must be no more than two sheets of construction-use cardboard, it must cross a river that is 30 cm in width, and it must bear a load of 1 kg. Nevertheless, the children were extremely ingenious and almost all satisfied the conditions. From among those, the five members of the screening committee evaluated their "expression of individuality", "soundness and stability as bridges", and the "beauty of their shape, color, and finish", and awarded first prizes (3 works, photo 1), structural design prizes (5), aesthetic design prizes (5) and prizes for effort (5). In addition, school incentive prizes were given to six schools with the highest participation rate of their registered students.

The prizes were awarded at the Civil Engineering Day Open House 2016 that was held on November 19 (Sat.). (Photo 2)

At the award ceremony, the children who won first prize talked about the innovative methods they used to create their entries and the thought they put into each one.

We are looking forward to many elementary school pupils submitting good entries again next year.

Details ☛ Build a Bridge with Cardboard Contest website:
http://www.nilim.go.jp/lab/bbg/event/buridgecontest/2016/2016bridge.html

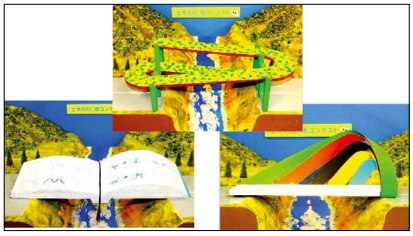


Photo 1. First prizes

Photo 2. Commemorative photo with prize winners at the awards ceremony

Approximate budget request by the NILIM for 2017

Planning and Research Administration Department, Planning Division
Administration Coordination Department, Planning and Coordination Division

The NILIM undertakes research on infrastructure that will create the society of the future.

In its approximate budget request for 2017, in addition to 12 ongoing challenges, it requests budgets for 6 new challenges in 2 fields (230 million yen: including 12 ongoing challenges).

○ Disaster Prevention, and Disaster Mitigation and Crisis Management

- Engineering Research on reinforcement of flood-fighting activities

It is predicted that climate change will increase the frequency of flooding that exceeds the capacity of disaster prevention measures, resulting in greater need for flood-fighting activities to reduce damage, so the NILIM will develop methods of assessing the amount of labor and time needed for flood-fighting and its effectiveness and will also develop technology to clarify locations where flood-fighting activities are particularly necessary in order to make such activities more efficient.

- Development of facility improvement technologies to ensure the health and safety of disaster victims while they are in evacuation centers.

The NILIM will propose specific methods of ensuring living environments and safety in evacuation centers set up following huge disasters, improve evacuation centers considering the living environment, and help secure the health and safety of evacuees in evacuation centers.

- Developing traffic passability diagnosis technologies during city fires caused by an earthquake

To prepare for huge disasters, the NILIM will develop technologies to evaluate the passability of roads in the event of city fires caused by a major earthquake, and support advance measures to enhance the initial response and improve urban districts in order to reduce the influence of fire on evacuation and on passage of emergency vehicles.

- Research on methods of promptly inspecting and restoring airport pavement following an earthquake disaster

In order that airports in disaster regions can quickly serve as bases for emergency transport, the NILIM will establish judgment standards that allow airport administrators to quickly inspect their airport pavement for damage and to select a restoration method.

○ Regional Revitalization and Livability Improvement

- Development of urban structure analysis and evaluation technologies based on diversifying daily life support functions

In order to further improve the sustainability and productivity of cities, the NILIM will develop subjective analysis and evaluation technologies for effective urban structures according to the characteristics of each city or region, and also will verify the possibility of reforming urban structures according to their functions based on the latest trends in life support functions, which are diversifying.

- Research on facade design methods intended to lower the energy consumption of buildings

To further advance the energy-saving capability of buildings, the NILIM will aim to establish facade design methods that can reduce the load of equipment and machinery.

* Facade design = outer shell design including outside walls, roofs, windows, etc.

Details ☛ document presented at a press conference on August 29, 2016 (NILIM website):
http://www.nilim.go.jp/lab/bcg/kisya/journal/kisya20160829.pdf

Publication (research achievements) < September,2016-November,2016 >

Download from here ☛ http://www.nilim.go.jp/lab/bcg/siryou/index.htm

PROJECT RESEARCH REPORT of NILIM

No.	Title of Paper	Project Leaders
50	Development of Inspection and Monitoring Technology for Preventive Control of Infrastructure	Research Coordinator for Construction Management
52	Research on Multiple Protection and Mitigation Systems against Tsunami-induced Disasters	Head of Coast Division

RESEARCH REPORT of NILIM

No.	Title of Paper	Names of Divisions
57	Compilation of Research Results over 5 Years (FY 2011-2015) by NILIM to Contribute Toward Reconstruction Following the Great East Japan Earthquake	National Institute for Land and Infrastructure Management

TECHNICAL NOTE of NILIM

No.	Title of Paper	Names of Divisions
888	Sedimentation Rate in Coastal Regions in Tokyo bay	Marine Environment Division
889	Consideration of the spatial arrangement of settlement habitats for free-living larvae	Marine Environment Division
890	A New Method for the Quantitative Evaluation of Services of Tidal Flats	Marine Environment Division
891	Damage to Nemuro Port and Its Surrounding Areas due to the Storm Surges and Waves of Typhoon 1523	Coastal Disaster Prevention Division
892	Study on Construction Works and Structural Design of Shore Protection Facilities in Port Areas for Their Improvement and Maintenance	Coastal, Marine and Disaster Prevention Department
893	Damage to Port Areas along Seto Inland Sea due to Storm Surge and Waves of Typhoon 1511	Coastal Disaster Prevention Division
894	Damage to Kushiro Port due to Storm Surge of an Extratropical Cyclone in 2015	Coastal Disaster Prevention Division
895	A bayesian inversion for a directional spectrum of ocean waves in shallow water using HF radar	Coastal Zone Systems Division
896	Analysis on World Container Ship Movement and Containerized Cargo Flow (2015)	Port Planning Division
897	An Analysis on Actual Practices of Waterway Navigation Using Tidal Window	Port Planning Division
898	A Study on Volume and Flow of Import/Export Maritime Container Cargo of Domestic Region	Port Systems Division
899	Considerations of Level 1 Reliability Design Method for Vertically Pile-Supported Wharves under Berthing Condition (Part 1)	Port Facilities Division
900	A Comparative Study on Safety Level of Circular Slip Failure Verification Method between Current and Previous Technical Standards	Port Facilities Division
901	Considerations Related to the Target Safety Level for Anchored Sheet Pile Quaywall in Permanent Situation	Port Facilities Division
902	A International Air Demand Model for Connecting Traffic Flows between Asian and North-American Destinations	Airport Planning Division
906	The Technical Reference on Environment Impact Assessment Technique for Road ProjectExamples of Environmental Conservation Measures on 13. Fauna, Flora, Ecosystem	Landscape and Ecology Division
912	Report of the Evaluation Sub Committee of NILIM in FY 2015 Evaluation Committee of NILIM	Research Administration and Evaluation Division
927	A Manual on Hydraulic Model Test to Evaluate the Stability of Artificial Reef Blocks against Waves	Coast Division
929	Quick Report of the Field Survey on the Building Damage by the 2016 Kumamoto Earthquake	Standards and Accreditation System Division

We provide you with research information.

・2016 Annual Report of NILIM

This web site introduces NILIM activities throughout the year, including research activities and achievements, future initiatives, etc.
Go to this web site: ☛ http://www.nilim.go.jp/english/annual/annual2016e.html

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